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Policy brief for School Leaders on the COSMOS Approach

Open schooling approach to science education



COSMOS (Creating Organizational Structures for Meaningful Science education through Open Schooling for all) / cosmosproject.eu

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Introduction to the Policy Briefs on the COSMOS Approach

This document compiles a series of policy briefs developed as part of the COSMOS project, an EU-funded initiative under the Horizon 2020 Research and Innovation programme. Each policy brief is designed to address the unique needs and perspectives of key stakeholders – **teachers, school leaders, policymakers, and the European Commission**. The goal of these briefs is to provide clear, evidence-based recommendations that promote the adoption of the COSMOS open schooling approach across various educational and policy contexts.

The development of these policy briefs was guided by a structured framework (D2.1 COSMOS Framework; Sarid, et al. 2024¹) that emphasized conciseness, actionable insights, and alignment with the COSMOS project's objectives. The guidelines ensured each brief focuses on the essential components of COSMOS: Core Organisational Structure for Promoting Open Schooling (CORPOS), Communities of Practice (CoP), Socio-Scientific Inquiry-Based Learning (SSIBL), and Teacher Professional Development (TPD). Together, these elements form a cohesive model that fosters educational innovation, community engagement, and critical socio-scientific inquiry within schools.

To create these briefs, we drew on the insights and recommendations from the COSMOS open schooling roadmaps (D6.2 Open Schooling Roadmaps), as well as implementations and lessons learned from this work at the primary (D3.1/D3.2) and secondary school level (D4.1/D4.2), case studies from schools implementing COSMOS across Europe (D6.1 Report on case studies, developed by partners, centred on particularly interesting SSIBL-CoP implementations in their countries during Round 1 and 2), and extensive research during the entire process (D7.1 Final Evaluation of COSMOS). Each brief highlights the specific benefits, expected outcomes, and tailored policy recommendations suited to its target audience. This document provides a comprehensive resource to guide educational stakeholders in understanding, implementing, and sustaining the COSMOS approach to science education reform, enhancing both student learning and community collaboration.

¹ A. Sarid, J. Boeve-de Pauw, A. Christodoulou, M. Doms, N. Gericke, D. Goldman, P. Reis, A. Veldkamp, S. Walan & M. C. P. J. Knippels (2024). Reconceptualizing open schooling: towards a multidimensional model of school openness. *Journal of Curriculum Studies*, 1–19. <https://doi.org/10.1080/00220272.2024.2392592>



COSMOS in a Brief for School Leaders: An Effective Model for Open Schooling through Science Education

Executive Summary

This policy brief introduces school leaders to the COSMOS project's open schooling model, which connects science education with community and real-world socio-scientific issues. COSMOS provides a framework that supports school leaders in transforming educational practices through its four core components: CORPOS, CoP, SSIBL, and TPD. School leaders play a critical role in fostering a school culture that embraces community engagement, collaborative inquiry, and sustainable professional development. By adopting the COSMOS approach, school leaders can enhance student motivation, foster partnerships with local stakeholders, and create lasting educational impact. This brief offers strategic recommendations for school leaders to support COSMOS implementation, including establishing partnerships, integrating SSIBL into the curriculum, and allocating resources for teacher development. The COSMOS model empowers school leaders to lead an inclusive, responsive, and impactful open schooling transformation that prepares students for active, informed citizenship.

Background and Context

The need for open schooling has become more prominent with shifts towards inquiry-based, context-aware, and community-driven learning approaches. Traditional education systems often struggle to address socio-scientific issues that are both global and local, such as climate change, public health, and sustainability. COSMOS addresses these gaps by equipping schools with tools and strategies for engaging students in meaningful, science-based community projects.

Key Components of the COSMOS Approach

1. **Core Organisational Structure for Promoting Open Schooling (CORPOS) or Open Schooling Team:** acts as an open schooling leadership group within each school, typically including teachers, community members, and school leaders. This structure facilitates collaboration between internal and external stakeholders, fostering a culture of shared responsibility and continuous adaptation to local needs.
2. **Community of Practice (CoP):** CoPs connect educators, students, community members, and experts, enabling collaborative learning. These communities encourage a partnership-based approach where local stakeholders actively contribute to and enhance the learning experience, ensuring that education is both relevant and impactful.
3. **Socio-Scientific Inquiry-Based Learning (SSIBL):** SSIBL promotes critical engagement with socio-scientific issues, encouraging students to "Ask, Find Out, and Act". Through this approach, students explore scientific inquiry in real-world contexts, making science education more engaging and relevant to societal challenges.
4. **Teacher Professional Development (TPD):** COSMOS includes robust TPD initiatives to help educators integrate open schooling and SSIBL practices into their teaching. TPD encourages teachers to adopt collaborative, reflective approaches to learning, thus strengthening their ability to facilitate inquiry-driven, community-based education.

Outcomes and Benefits

1. **Enhanced Student Engagement:** By involving students in community-relevant scientific inquiries, the COSMOS approach increases student engagement and motivation to learn. This approach allows students to see the real-world impact of their studies, fostering a deeper commitment to their education.
2. **Improved Critical Thinking and Problem-Solving Skills:** SSIBL emphasizes critical thinking, enabling students to tackle complex socio-scientific issues. By analysing and addressing real-world problems, students develop skills that are essential for their future roles as engaged citizens.
3. **Enhanced action competence towards sustainability:** COSMOS approach develops students' knowledge about their own possibilities to contribute to a more sustainable future through individual and collective action, boost their self confidence in their

capacity to create an impact regarding SSIs, and ultimately to feel empowered and driven to engage in action taking.

4. **Stronger Community Ties:** CoP initiatives connect schools with local stakeholders, creating partnerships that enhance learning and deepen community bonds. This collaboration promotes mutual understanding and builds a supportive network for sustainable educational practices.
5. **Teacher Professional Development:** TPD initiatives help teachers integrate SSIBL and CoP models effectively, fostering continuous professional growth and collaborative teaching practices. This ongoing development empowers teachers to become leaders in implementing innovative educational approaches.

Policy Recommendations

1. **Partnerships with Community Organizations:** Policies should encourage schools to form partnerships with local governments, businesses, NGOs, and other stakeholders. Early stakeholder engagement fosters support and provides valuable input, enriching the educational process.
2. **Integration into Curriculum:** Policies should allow flexibility for curriculum adaptations that support SSIBL and open schooling practices. This will enable educators to incorporate real-world issues into teaching, making learning more relevant to students.
3. **Flexibility in Teaching Methods:** Schools should have the freedom to adopt teaching methods like inquiry-based and project-based learning. Such flexibility supports innovative educational models and prepares students to tackle real-life challenges.
4. **Funding Support:** Adequate funding and opportunities are essential for teacher development and open schooling projects. Financial support for these initiatives ensures that schools can effectively implement the COSMOS approach without compromising other resources.
5. **Incentives for Schools:** To encourage adoption, schools that implement COSMOS should receive grants or recognition. This incentive structure will foster a commitment to educational innovation and community engagement.

Challenges and Solutions

1. **Resource Limitations:** Implementing open schooling models requires time and financial resources. Schools can mitigate resource constraints by establishing partnerships with community organizations, which often provide support in various forms, such as funding, expertise, or materials.
2. **Resistance to Change:** Adopting new teaching methods may encounter resistance from educators and administrators. Training sessions and workshops on the benefits and processes of COSMOS can build support and ease transitions.

3. **Equity and Inclusion:** COSMOS should be accessible to all students, regardless of background. Policies must ensure inclusivity, offering additional support for schools in under-resourced areas to participate fully in open schooling initiatives.

Glossary

Alma Löv	Museum of Unexp. Art
BBC	Beit Berl College
COSMOS	Creating Organisational Structures for Meaningful science education through Open Schooling for all
CORPOS	Core ORganisational Structure for Promoting Open Schooling
CoP	Community of Practice
HEI	Higher Education Institution
IE-UL	Instituto de Educação da Universidade de Lisboa
KdG	Karel De Grote Hogeschool katholieke hogeschool
KU	Karlstad University
MoE	Ministry of Education
SDG	Sustainable Development Goals
SSI	Socio-Scientific Issue
SSIBL	Socio-Scientific Inquiry-Based Learning
SOTON	University of Southampton
STEM	Science Technology Engineering Mathematics
TPD	Teacher Professional Development
UU	Utrecht University
WP	Work Package
WSC	Winchester Science Centre

Project partners



Utrecht University, Freudenthal Institute (Project Coordinator)
The Netherlands



University of Southampton
England



Karel de Grote University of Applied Sciences and Arts, Centre of Expertise in Urban Education, Belgium



Karlstads University, Research Centre SMEER (Science, Mathematics, Engineering Education Research), Sweden



University of Lisbon, Institute for Education, Portugal



Beit Berl College, Faculty of Education, Israel



Euroface Consulting, Czech Republic



Universiteits Museum Utrecht



Winchester Science Centre & Planetarium



Winchester Science Centre (WSC), England



Alma Löv Museum, Sweden



Ciência Viva, National Agency for Scientific and Technological Culture, Portugal



Ministry of Education, Department for Research and Development, Experiments and Initiatives